Notice of Allowability	Application No.	Applicant(s)	
	10/829,182	KOMARURA, MITSUYA	
	Examiner	Art Unit	
	James E. Goodley	2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *4/22/2004*.

2. ☒ The allowed claim(s) is/are *1-9*.

3. ☒ The drawings filed on *16 June 2004* are accepted by the Examiner.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 2/24/2005
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

Allowable Subject Matter

Claims 1-9 are allowed.

The following is an examiner's statement of reasons for allowance: The prior art of record fails to provide or suggest a pulse width modulation (PWM) signal generator for generating one or two pulses corresponding to a value represented by a pulse code modulation digital signal, wherein when the value represented by the digital signal is zero, the first pulse and the second pulse are equal to each other in pulse width, and when the value represented by the digital signal changes by one, one of the first and second pulses does not change in pulse width and the other of the first and second pulses changes in pulse width by two slots (claims 1, 6, 8 and 9); or when the value represented by the digital signal is an odd-number, generating the first PWM signal and a second PWM signal, alternately, said second PWM signal comprising two pulses having a total pulse width corresponding to the odd value and placed in a symmetric positional relationship to the one pulse of two pulses of the first PWM signal with respect to the position of the ¼ and ¾ of the predetermined length (claim 7), in combination with the rest of the limitations of claims 1 and 6-9.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Masuda et al. (US 5,148,168) discloses a pulse width modulation (PWM) signal generator for generating two pulses which have a pulse width corresponding to a value represented by a pulse code modulation (PCM) digital signal and which have a symmetric positional relationship with respect to half of a sampling period (Ts) as a first pulse width modulation signal, wherein said signal generating device includes a PCM-PWM converter which generates first and second pulses in accordance with the value represented by the digital signal, and a difference detector which outputs the difference between the first and second pulses, as the first pulse width modulation signal. ***Masuda*** also discloses an over-sampling circuit, noise shaping circuit (performing the function of a delta-sigma modulator) and a low-pass filter in a series combination in the PWM generator. However, ***Masuda*** does not disclose when the value represented by the digital signal is zero, the first pulse and the second pulse are equal to each other in pulse width, and when the value represented by the digital signal changes by one, one of the first and second pulses does not change in pulse width and the other of the first and second pulses changes in pulse width by two slots; or when the value represented by the digital signal is an odd-number, generating the first PWM signal and a second PWM signal, alternately, said second PWM signal comprising two pulses having a total pulse width corresponding to the odd value and placed in a symmetric positional

relationship to the one pulse of two pulses of the first PWM signal with respect to the position of the ¼ and ¾ of the predetermined length.

Masuda et al. (US 6,795,004) discloses a pulse width modulation (PWM) signal generator for generating two pulses which have a pulse width corresponding to a value represented by a pulse code modulation (PCM) digital signal and which have a symmetric positional relationship with respect to half of a sampling period (Ts) as a first pulse width modulation signal, wherein said signal generating device includes a PCM-PWM converter which generates first and second pulses in accordance with the value represented by the digital signal, and a difference detector which outputs the difference between the first and second pulses, as the first pulse width modulation signal. ***Masuda*** also discloses an over-sampling circuit/delta-sigma modulator, and a low-pass filter in a series combination in the PWM generator. However, ***Masuda*** does not disclose when the value represented by the digital signal is zero, the first pulse and the second pulse are equal to each other in pulse width, and when the value represented by the digital signal changes by one, one of the first and second pulses does not change in pulse width and the other of the first and second pulses changes in pulse width by two slots; or when the value represented by the digital signal is an odd-number, generating the first PWM signal and a second PWM signal, alternately, said second PWM signal comprising two pulses having a total pulse width corresponding to the odd value and placed in a symmetric positional relationship to the one pulse of two pulses of the first PWM signal with respect to the position of the ¼ and ¾ of the predetermined length.

Toyomaki (US 5,008,675) discloses a pulse width modulation (PWM) signal generator for generating two pulses which have a pulse width corresponding to a value represented by a pulse code modulation (PCM) digital signal and which have a symmetric positional relationship with respect to half of a sampling period (Ts) as a first pulse width modulation signal, wherein said signal generating device includes a PCM-PWM converter which generates first and second pulses in accordance with the value represented by the digital signal, and a difference detector which outputs the difference between the first and second pulses, as the first pulse width modulation signal. However, ***Toyomaki*** does not disclose when the value represented by the digital signal is zero, the first pulse and the second pulse are equal to each other in pulse width, and when the value represented by the digital signal changes by one, one of the first and second pulses does not change in pulse width and the other of the first and second pulses changes in pulse width by two slots; or when the value represented by the digital signal is an odd-number, generating the first PWM signal and a second PWM signal, alternately, said second PWM signal comprising two pulses having a total pulse width corresponding to the odd value and placed in a symmetric positional relationship to the one pulse of two pulses of the first PWM signal with respect to the position of the ¼ and ¾ of the predetermined length. ***Toyomaki*** also does not disclose an over-sampling circuit, a delta-sigma modulator, or a low-pass filter in a series combination in the PWM generator.

Ueki et al. (US 5,148,168) discloses a pulse width modulation (PWM) signal generator for generating two pulses which have a pulse width corresponding to a value

represented by a pulse code modulation (PCM) digital signal and which have a symmetric positional relationship with respect to half of a sampling period (Ts) as a first pulse width modulation signal, wherein said signal generating device includes a PCM-PWM converter which generates first and second pulses in accordance with the value represented by the digital signal, and a difference detector which outputs the difference between the first and second pulses, as the first pulse width modulation signal. ***Ueki*** also discloses noise shaping circuit (performing the function of a delta-sigma modulator and oversampling) and a low-pass filter in a series combination in the PWM generator. However, ***Ueki*** does not disclose when the value represented by the digital signal is zero, the first pulse and the second pulse are equal to each other in pulse width, and when the value represented by the digital signal changes by one, one of the first and second pulses does not change in pulse width and the other of the first and second pulses changes in pulse width by two slots; or when the value represented by the digital signal is an odd-number, generating the first PWM signal and a second PWM signal, alternately, said second PWM signal comprising two pulses having a total pulse width corresponding to the odd value and placed in a symmetric positional relationship to the one pulse of two pulses of the first PWM signal with respect to the position of the ¼ and ¾ of the predetermined length.

JG

Zandra V. Smith

Primary Examiner